ORIGINAL
(Red)

Frankford Arsenal
Philadelphia, Pennsylvania
TDD No. F3-8105-18
EPA No. PA-300

FIELD TRIP REPORT

Introduction

The Field Investigation Team Region III (FIT III) conducted a site visit for the purpose of completing a Preliminary Assessment at Frankford Arsenal on May 22, 1981. The FIT team representative was Michael A. Pelensky of Ecology and Environment, Inc. (E&E).

Contacts

Fran Mulhern
Federal Facilities Coordinator
EPA, Region III

Charles Dinger
Joseph Janson
Joseph Esposito
Frankford Arsenal Caretaker Facility

Harry Walters, Plant Manager
Space Age Engineering, Inc.
(Protective Maintenance Contractors)

Telephone Contacts

Tiberius Panaccio
Commander's Representative
Frankford Arsenal Caretaker Facility
215-533-0367

A. Anderson
USATHMA, Aberdeen Proving Ground
301-671-3434

Comments

According to Frankford Arsenal Caretaker Facility representatives (T. Panaccio and C. Dinger) and US Army Toxic and Hazardous Materials Agency (USATHMA) letter of 13 February 1981 (copy in Section 7 of this report), all buildings and lands within Frankford Arsenal are clear of toxic and hazardous materials including those buildings and areas that have been decontaminated under Army contract DAA K11-79-C-0135 by Rockwell International Energy Systems Group. The requirements for unrestricted use have been met. NRC has also certified the radiological decontaminated areas.

According to USATHMA feature story on Frankford Arsenal decon/cleanup, (copy in Section 7 of this report) it was stressed that the decontamination/cleanup met all Federal, State and local regulatory requirements.

According to T. Panaccio and C. Dinger, all the Arsenal buildings are closed or boarded up except for the caretaker facility and protective maintenance related functions and also except for privately leased buildings which do not entail manufacturing nor hazardous waste generation.

During this site visit, the Rockwell International Energy Systems Group Final Report dated January 1981, for the Frankford Arsenal Decontamination/Cleanup Program was made available for review. Excerpts from the report are included in Section 7 of this report. Pertinent details in the report are summarized below.

Comments (continued)

Sampling and analysis were performed before and after decontamination to meet the USATHMA acceptable levels of cleanness. With the approval of the City of Philadelphia, water in the sumps contaminated with heavy metal residues was analyzed, flushed and drained into the city sanitary sewer system. Sump sludge containing heavy metals was disposed of off site.

According to Mr. Anderson, USATHMA, by telephone conversation 5/25/81, bulk inorganic and organic chemicals and wastes including solvents, plating wastes, etc., were disposed of under contract, off-site, approximately August 1979.

Mr. Joseph Janson, Frankford Arsenal Caretaker Facility, indicated that there are 106 Transformers, 196 Capacitors, three drums of PCBs, and a portion of one drum containing PCB cleanup wastes at Frankford Arsenal. Samples of material from the three drums and from two of the tansformers were obtained and sent to the US Environmental Hygiene Agency for analysis to confirm the contents. It is planned to take samples from the other transformers also.

Mr. Harry Walters, Space Age Engineering, indicated that he has advised his corporate office and also Rock Island Arsenal (the responsible Army facility) that PCBs, including tranformer and capacitors are located at the facility and that pertinent EPA regulations should be followed. There are no PCB spill prevention procedures at Frankford and Mr. Walters indicated there have only been several minor leaks which have been cleaned up with resultant wastes (less than one drum) contained and stored at the facility. The drummed PCBs and wastes are stored in a 2 ft. thick concrete walled blockhouse within a closed grated iron gate.

Comments (continued)

According to the Rockwell report, USATHMA awarded a contract to Battelle Columbus Laboratories for a five month study to confirm or deny the presence of contamination and to develop alternatives for decontamination. Following evaluation of the suggested decontamination alternatives, the Department of the Army approved the recommendation to cleanup the Arsenal for unrestricted use. A $6.3 million cost plus fixed fee contract was awarded September 1979 to Rockwell calling for on-site decontamination and cleanup program to be completed February 1981. The contract was completed on schedule. The work scope was based upon results of a Battelle presurvey which indicated the presence of three generic types of contaminants, specifically (1) heavy metal residues, (2) minute quantities of explosive residues, and (3) low-level radiological contaminations. Heavy metals (lead, cadmium, chromium and mercury) were due primarily to lead based paint on interior surfaces of the arsenal buildings and to operations of certain plating and metallurgical laboratories at the facility. The explosives residues (on the order of micrograms per square meter of surface area) were the result of small caliber munitions manufacturing and development of cartridge and propellant devices. The low level radiological contamination was due to the use of depleted uranium employed in the development of armor piercing projectiles and other special nuclear materials (e.g. radium) for fire control instruments.

According to the Rockwell report, the order of cleanup of existing residues in an area, for maximizing personnel protection, was explosive residues first (automatic remote flamers wherever possible), then the radiological contaminants (physical removal of materials or surface removal by sandblasting and off-site disposal of contaminated materials), and finally, the metal wastes (primarily loose and flaking paint removal, repainting, and off site disposal of the heavy metal paint residues).

ORIGINAL
(Red)

Comments (continued)

According to the Rockwell report, USATHMA assumed technical direction for the decontamination and cleanup of Frankford Arsenal, June 1977. Major objectives included determination of the nature and extent of contamination and also included decontamination and cleanup operations in accordance with requirements of the Federal Property Administration Services Act for property turnover to the General Services Administration for disposition. As a first step, a records search was conducted by USATHMA revealing several areas of concern including low level radiologically contaminated buildings and related ventilation systems, deposits of explosive/pyrotechnic residues in buildings and support systems, subsurface and underwater unexploded ordnance, and organic and inorganic chemical residues in a number of buildings and their support systems. Of particular concern was the underground waste discharge system including pumps, traps, and drain lines suspected of containing explosive/pyrotechnic materials.

According to the Rockwell report, following the records search, the Arsenal was divided into four areas (A, B, C, and D - see map in Section 7 of this report) for the survey and assessment phase of the decontamination project.

A visual and instrumentation survey and evaluation of Area "A", completed November 1977 and a portion of Area "B", completed December 1977, by an in-house Department of Defense technical team found no contamination and as a result these areas were certified for release. Subsequently, all buildings and lands within areas designated "C" and "D" and those remaining portions of "B" not previously certified were decontaminated under contract as indicated in "Comments" paragraph 1 above.

Observations

Except for one electrical substation, the security office, and caretaker facility office, the Arsenal buildings were not entered. "Off Limits" signs were observed posted on the buildings.

A tour of the Arsenal grounds was conducted (under the guidance of Joseph Esposito, Caretaker Facility) and no evidence of possible hazardous waste was observed.

PCB transformers were visually observed with inadequate or non-existent labelling on the transformers and buildings housing the transformers. Spill prevention measures such as curbing or berms around the transformers or containment trays were not evident.

A small area (possibly a few ounces) of oil under a capacitor tray was observed in the one substation entered between buildings 45 and 46. Mr. Walters (Space Age Engineering) was present during this inspection and this was called to his attention.

Action Items

PCB compliance inspection should be conducted in particular for identification, labelling, storage areas, and spill prevention and containment procedures.

In view of the decontamination and cleanup of Frankford Arsenal resulting in USATHMA clearance for unrestricted use, no other action is necessary.

MAP OF THE
FRANKFORD ARS. 4L

SECTION 4

ORIGINAL
(Red)

Frankford Arsenal
Philadelphia, Pennsylvania
TDD No. F3-8105-18
EPA No. PA-300

FACT SHEET

Fact	Source
1. Frankford Arsenal was closed September 1977.	1. T. Pannaccio and C. Dinger Frankford Arsenal Caretaker Facility and Rockwell International Report, January 1981.
2. Frankford Arsenal was assessed for contamination and subsequently decontamined by Rockwell International.	2. T. Pannaccio and C. Dinger
3. Bulk chemicals and chemical wastes were disposed of off site approximately August 1979.	3. A. Anderson, USATHMA, telecon 5/26/81
4. Radiological and heavy metal wastes were disposed of off site. Explosives were flamed on-site.	4. Rockwell International Report, January 1981
5. USATHMA provided a statement of clearance and certified that the requirements for unrestricted use have been met.	5. USATHMA letter, 13 Feb 81, Subject: Statement of Clearance for Frankford Arsenal
6. No hazardous waste is currently being generated at the Arsenal.	6. C. Dinger
7. PCB transformers and capacitors, and buildings or areas containing these items are not properly labelled nor properly stored.	7. Visual observation - 5/22/81
8. 106 PCB transformers, 196 PCB capacitors, 3 PCB drums and a portion of 1 drum containing PCB wastes are currently on Arsenal property.	8. J. Janson, Frankford Arsenal Caretaker Facility

SECTION 5

nap. There is, on the
undated in any year.
concerned with future

lily available informa-
spections. In general,
consideration the pos-
pt where those effects
an areas where the up-
umid regions where the
semiarid regions where
maller drainage basins,

reparation of flood-prone
ng the areas of potential
for other purposes such
se regulations. Such de-
y, other Federal agencies,

FRANKFORD, PA
QUADRANGLE
TDD F3 8105-18
PA 300

SECTION 6

8810-47-37

NUS CORPORATION
999 WEST VALLEY ROAD
WAYNE, PENNSYLVANIA 19087
215-687-9510

ORIGINAL (NEW)

October 31, 1989
T-585-10-9-157
68-01-7346

Mr. Anthony Dappolone
U.S. Environmental Protection Agency
841 Chestnut Building
Ninth and Chestnut Streets
Philadelphia, PA 19107

Dear Mr. Dappolone:

Attached please find one uncontrolled final copy of the Non-Sampling Site Reconnaissance Summary report for Frankford Arsenal, prepared under TDD No. F3-8810-47. Please forward to Lorie Acker. Thank you.

Please endorse below confirming that you have received the attached subject data and return the form to the above address.

Sincerely,

Garth Glenn/nmd

Garth Glenn
Regional Operations Manager,
FIT 3

GG/nmd

Attachments

Signature: _____
Anthony Dappolone

Date: 11/28/89

ORIGINAL
(Red)

U.S. COAST GUARD

MARINE SAFETY/GROUP OFFICE

PHILADELPHIA PENNSYLVANIA

FACSIMILE COVER SHEET

Frankford Arsenal
PA-300

DATE: _____

FROM: Breck Smith

TO: Jim McCreary
EPA HTC

FAX NUMBER: 597-9890

REMARKS: _____

_____

_____

B Smith
RELEASED BY

TOTAL NUMBER OF PAGES (INCLUDING COVER SHEET) 2

FACSIMILE NUMBERS:	COMMERCIAL	FTS
COMMUNICATIONS CENTER	(215) 271-4833	346-9833
ADMIN/PERSRU/SUPPLY	(215) 271-4919	346-9919
PORT OPERATIONS/INSPECTIONS INVESTIGATIONS/VESSEL DOC	(215) 271-4899	346-9899

ONE WASHINGTON AVENUE
PHILADELPHIA, PENNSYLVANIA
19147-4395

0816.

8810-47-12

NUS CORPORATION
A Halliburton Company

FIELD INVESTIGATION TEAM ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCES FACILITIES — ZONE I

NUS CORPORATION
SUPERFUND DIVISION

NC C? DE G9

ORIGINAL
(Red)

P 190328Z JUN 89
FM COGARD MSO PHILADELPHIA PA
TO NC/CCGDFIVE PORTSMOUTH VA//OPC/M//
INFO COGARD NATIONAL RESPONSE CENTER WASHINGTON DC
ZEN/EPA REGION THREE
ZEN/PA STATE DER
ZEN/US FISH AND WILDLIFE SERVICE
BT
UNCLAS //N16465//
POLREP 1 POTENTIAL MINOR, UNK DRUM, FRANKFORT ARSENAL, PHILA, PA.
PIN 05P-04203-89
1. SITUATION:
A. 1812450 JUN 89 RCVD REPORT FM CG AUXILIARY VSL 18248 OF A BLUE PLASTIC DRUM FLOATING IN THE DELAWARE RIVER. DRUM TOWED TO THE NEARBY FRANKFORT ARSENAL BOAT RAMP AND SECURED ON THE DOCK.
THE DRUM IS APPROX 1/4-1/2 FULL OF AN UNK LIQUID. THE DRUM WAS NOT OBSERVED LEAKING.
B. DOT NR ON DRUM: E-7035-55. NO OTHER IDENTIFICATION.
2. ACTION TAKEN:
A. 1812450 RCVD RPT OF DRUM IN DELAWARE RIVER.
B. 13300 NTFD D5 (OPC)
C. 14300 NTFD PA STATE DER.
D. 15070 D5 AND NRC UNABLE TO ACCESS CERCLA FUND.
E. 16000 NTFD PHILA FIRE & POLICE DEPT.
F. 16450 CONTACTED GUARDING CONSTRUCTION COMPANY FOR CLEANUP ETA 18000.
G. 18050 MSO PERSONNEL O/S. DISCOVERED A SECOND DRUM NEAR THE BOAT RAMP ONSHORE. DESC: METAL, RUSTED 55 GAL DRUM, CONTAINS A SMALL AMOUNT OF AN UNK LIQUID. DRUM DOES NOT APPEAR TO BE LEAKING.
H. 18150 GUARDIAN CONSTRUCTION CO. O/S.
I. 19300 DRUMS OVERPACKED & SAMPLED. PH OF BOTH DRUMS WAS 5.
J. 20000 DRUMS SECURED ONSITE.
3. FUTURE PLANS AND RECOMMENDATIONS:
A. MSO PERSONNEL TO MONITOR.
B. REMOVAL OF DRUMS BY GUARDIAN TO BE CONDUCTED PENDING RESULTS OF SAMPLE ANALYSIS.
C. REQUEST CERCLA CASE BE OPENED AND FUNDS BE ACCESSED FOR REMOVAL AND DISPOSAL OF DRUMS.
. CASE PENDS.
BT
NNNN
TOD-06:19:04:25:18

CO	✓	ADMIN		MRO		GMF	
XO		PRV		PAO	✓	BCST	
OOD	✓	SUP		NAFA			
P/OPS	✓	CMS		RES		8	
G/OPS		HS		AUX			
ENG		SS		REDOAK			
DOC		GM		CAT			
INS		RM		CLEAT			
INV		ET		ANT			
COMP		COMMS		TRNG			

CO _____
XO _____
PS _____
OPS _____
ENG _____
OOD _____
JOOD _____

SIO Paul ORIGINAL (Red)

Recon

AWARD FEE PERFORMANCE EVENT REPORT Date: 5/4/89

PART II. EVALUATION CRITERIA SCORE SHEET

CONTRACT NO.	CONTRACTOR	NO. OF HOURS
68-01-7346	NUS CORPORATION - ZONE 1	TDD = 8810-47

EPA REGION	DATES OF REPORTED EVENT
Site = Frankford Arsenal	FROM: TO:
CONTRACTOR CONTACT PHONE NO.	EPA PERFORMANCE MONITOR PHONE NO.

PERFORMANCE CRITERIA	RATING (Circle)	SUPPORTING COMMENTS
PROJECT PLANNING - ORGANIZING (E.G., WORK PLAN) - DEVELOPMENT, DATA REVIEW - SCHEDULING - BUDGETING	5.0 2.5 4.5 2.0 4.0 1.5 3.5 1.0 3.0 0.5	
TECHNICAL COMPETENCE & INNOVATION - EFFECTIVENESS OF ANALYSES - MEET PLANNED GOALS - SUPPORT COE, STATE, ENFORCEMENT - ADHERE TO REGS. & PROCEDURES - APPROACH CREATIVITY/INGENUITY - EXPERT TESTIMONY	5.0 2.5 4.5 2.0 4.0 1.5 3.5 1.0 3.0 0.5	
SCHEDULE & COST CONTROL - BUDGET (HOURS & COST) MAINTENANCE - PRIORITY/SCHEDULE ADJUSTMENTS - COST MINIMIZATION	5.0 2.5 4.5 2.0 4.0 1.5 3.5 1.0 3.0 0.5	
REPORTING - TIMELINESS - CLARITY - THOROUGHNESS	5.0 2.5 4.5 2.0 4.0 1.5 3.5 1.0 3.0 0.5	
RESOURCE UTILIZATION - STAFFING - SUBCONTRACTING - EQUIPMENT, TRAVEL, ETC.	5.0 2.5 4.5 2.0 4.0 1.5 3.5 1.0 3.0 0.5	
EFFORT - RESPONSIVENESS - MOBILIZATION - DAY-TO-DAY - SPECIAL STUDIES (E.G., ADVERSE/ DANGEROUS CONDITIONS)	5.0 2.5 4.5 2.0 4.0 1.5 3.5 1.0 3.0 0.5	

Scope of Work

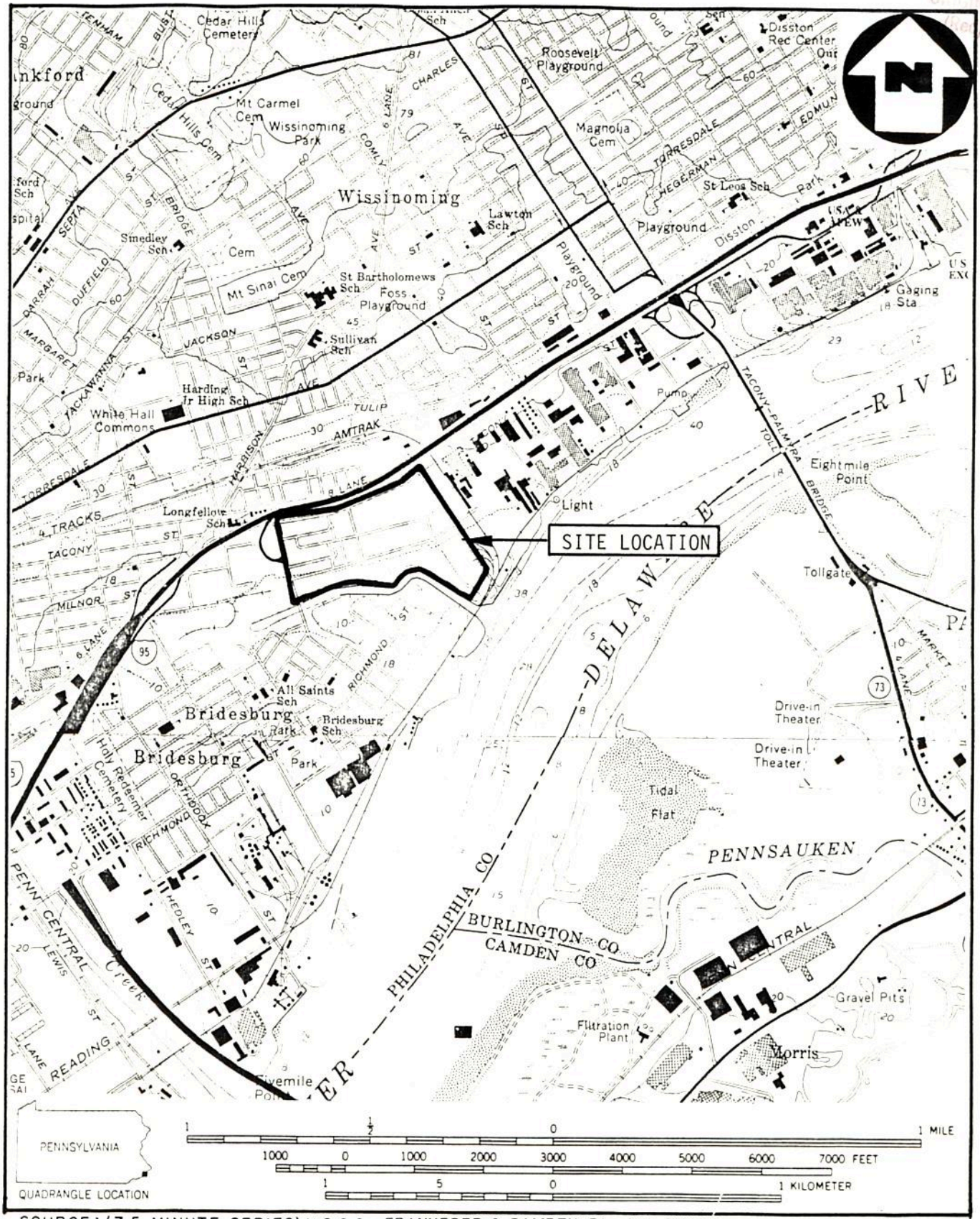
NUS FIT 3 was tasked to conduct a non-sampling site reconnaissance of the Frankford Arsenal site, located in Philadelphia, Philadelphia County, Pennsylvania (see figure 1, page 2).

Background Information

The Frankford Arsenal is a 116-acre facility located in the northeastern portion of the city of Philadelphia (see figure 2, page 3). The facility operated as a United States Army munitions manufacturing plant from 1816 until 1977. From its opening until the late 1950s, Frankford Arsenal was one of the key installations responsible for the manufacturing of small-caliber ammunition. Following the Korean War, however, the role of munitions facilities such as the Frankford Arsenal changed from production to research and development. By the end of the 1970s, such facilities were being decommissioned.

In 1977, the United States Army chose to close Frankford Arsenal, with the intention of selling it to a civilian organization. Before the facility could be sold, however, it had to be decontaminated and released for unrestricted access by the United States Army. To address the potential contaminants on site and to examine methods of cleanup, the Army prepared an in-house study of the site in December 1977. This initial study identified three areas of concern at the subject site: low-level radiologicals, residual pyrotechnics (explosives), and trace levels of heavy metals.

Following this initial study, the United States Army contracted Battelle Columbus Laboratories (BCL) to prepare a feasibility study to confirm the Army's original findings and to explore decontamination alternatives. On September 21, 1978, the Army awarded an eight-million-dollar contract to Rockwell International Corporation for a three-phase remediation/decontamination plan. Under this plan, the property was divided into four areas, and contaminants were identified in each area. Low-level radiological contaminants were then removed from buildings, sumps, and air vents. (Radiological contaminants, mostly uranium and radium, were on site as a result of developmental projects for armor-piercing weapons and fire-control devices.) Heavy metal contamination and pyrotechnics were also addressed. Residual heavy metals, mainly from lead-based paints, chromium, and copper plating operations, and mercury from switches were detected in on-site buildings, sumps, and vents. All radiologicals and heavy metals were disposed at an off-site location. Residual (ug/m^3) pyrotechnics were flamed in situ.



SOURCE: (7.5 MINUTE SERIES) U.S.G.S. FRANKFORD & CAMDEN, PA - N.J. QUADS.

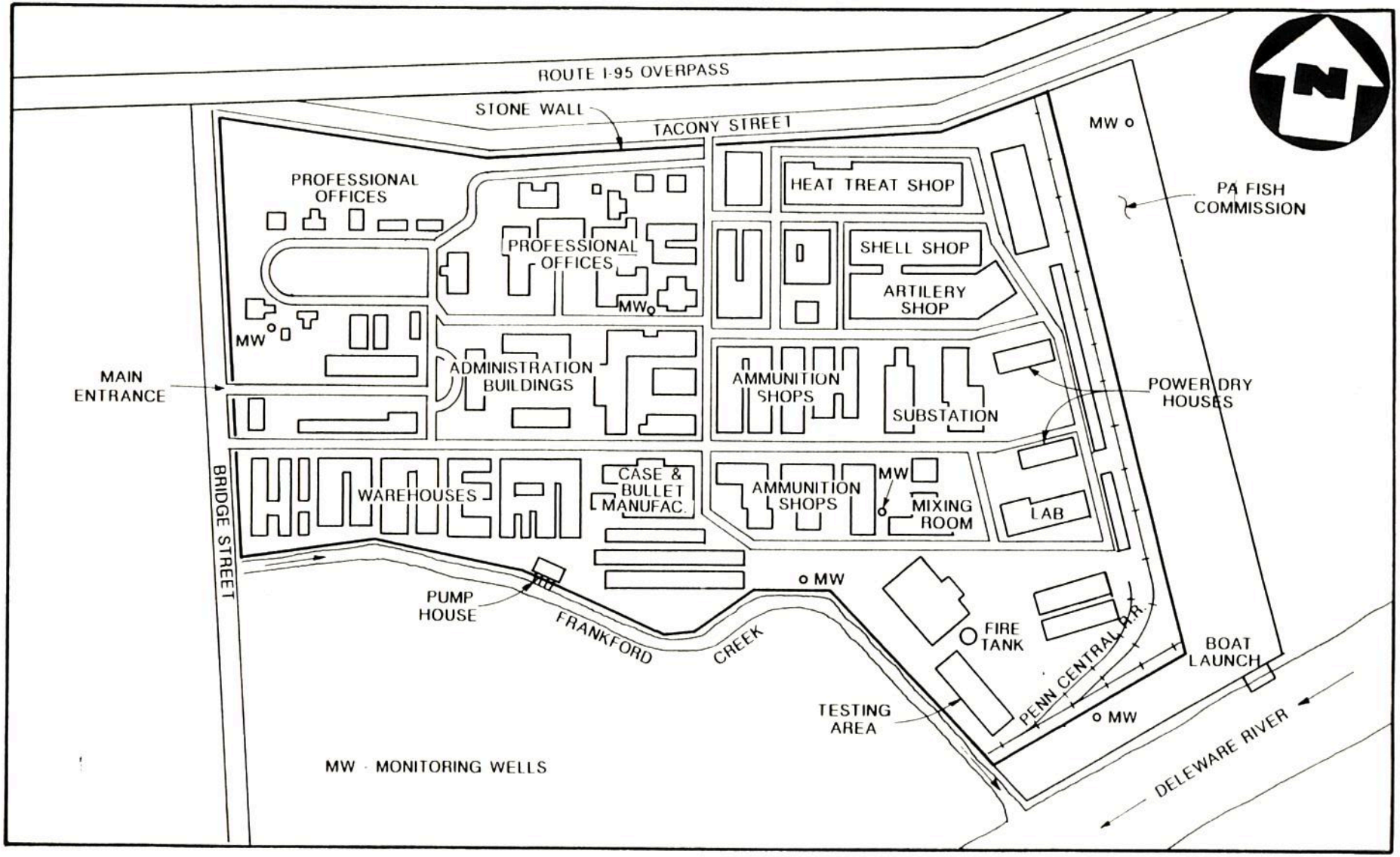
FIGURE 1

SITE LOCATION MAP

FRANKFORD ARSENAL, PHILADELPHIA, PA

SCALE 1: 24000

NUS CORPORATION



SITE SKETCH

FRANKFORD ARSENAL, PHILADELPHIA, PA

(NO SCALE)

FIGURE 2

NUS CORPORATION

Decontamination, which began in February 1980, was completed in January 1981, and the United States Army Toxic and Hazardous Materials Office (USATHMO) certified the site for unrestricted access. Additional clearance was granted by the Nuclear Regulatory Commission and the city of Philadelphia.

In August 1980, Ecology and Environment, Incorporated (E & E) performed a preliminary assessment at the subject site. Based on the findings of the preliminary assessment, it was concluded that there was no hazardous waste currently being generated on the site, and no evidence of on-site disposal was found. E & E, however, was concerned with the numerous substations that were on site and the transformers and capacitors that were associated with these stations. E & E concluded that these transformers had been abandoned when the facility was closed. The substations consisted of 106 transformers and 196 capacitors. The basis for the concern was the polychlorinated biphenyl (PCB) content of the equipment and the lack of associated spill prevention mechanisms. Additional concern was raised because of three drums of PCB oil that were on site. In an interview with Bud Phillips, the superintendent of the Arsenal Business Center, which now occupies the site, it was revealed that these transformers and capacitors represented substations that had been shut down in the closure of the arsenal. However, the transformers and capacitors had not been abandoned; in fact, they had remained operational.

In 1983, the site was sold to Hankin and Associates for development as a private business center (the Arsenal Business Center).

On February 13, 1989, NUS FIT 3 conducted a non-sampling site reconnaissance of the subject site. At the time of the site visit, no waste was being generated or stored at the facility. All of the transformers at the site, except two, were operational and functioning.

Mr. Phillips, representing the Arsenal Business Center, provided the FIT with a detailed account of each substation. In 1981, Reuter and Haney, acting as electrical subcontractors for the United States Army, sampled and tested all transformers and capacitors on site for PCB content, moisture, and overall structural integrity. When the arsenal re-opened, Reuter and Haney oversaw the repowering of each of the substations. In addition, Reuter and Haney had historically provided quarterly documentation to EPA officials concerning the integrity, PCB content, and number of transformers. They also oversaw the removal, under manifest, of the PCB oils that were on site at the time of the E & E preliminary assessment.

Currently, Moore Electric Company provides EPA with similar information concerning electrical equipment on site. Moore Electric claims that no nonoperational transformers are currently on site and, with the exception of two, all are being operated. Furthermore, no oils are stored on site. Transformers are labeled for PCB content and are periodically inspected visually. No spills have been reported at the site.

Conditions at the former arsenal during the FIT inspection revealed that approximately one-half of the existing buildings were occupied. A majority of the northern and northwestern portions of the facility had been used for professional offices, and the southern portion was occupied mainly by warehouse space. The eastern portion of the former Frankford Arsenal property has been donated to the Pennsylvania Fish Commission, which operates a boat launch on the Delaware River from this area (see figure 1, page 2, and figure 2, page 3).

During the FIT 3 investigation, five monitoring wells were observed on and in the immediate vicinity of the subject site (three on site and two on the Pennsylvania Fish Commission property). Mr. Phillips, who has been associated with the arsenal property in various capacities for the past 26 years, was unsure of the total number of wells on site, the installers of the wells, or any sample results that existed from the sampling of these wells. Mr. Phillips did feel, however, that the wells were installed during the second phase of the Army's remedial program during the spring of 1979.

Sampling to Date

During the initial feasibility survey that took place on the site, prior to the decontamination process, BCL collected over 4,000 samples from buildings, vents, and sumps at the arsenal. Of the 210 structures sampled, 170 buildings, 41 vents, 15 sewers, and 4 outside areas were found to exceed contract limits for either heavy metals, radiologicals, or explosives. Contract limits were established for these three groups of compounds by using federal, state, and local standards. In some cases, where no government standards existed, limits were derived using any available information. The following were the general guidelines that had to be met before the site could be approved for unrestricted use.

Site Name: Frankford Arsenal
TDD No.: F3-8810-47

Chart 1

Medium	Contaminant	Guideline or Disposal	Level
Soil	Metals Radiologicals Explosives	All contaminated soils removed All contaminated soil removed All contaminated soil flushed	
Water	Metals Radiologicals Explosives	See chart 2 See chart 2 See chart 2	
Air	Metals Radiologicals Explosives	Mercury, lead, chromium, and cadmium U-238 No sampling conducted	1.6 ug/m^3 3 X 10^{-12}
Surface	Metals Radiologicals Explosives	Mercury, lead, chromium, and cadmium U-238 Removed by flushing	1.6 ug/m^3 1,000 dpm

Chart 2

Type	Allowable Limit in Sewer	Allowable Limit in Surface
Metals	mercury: 0.005 mg/l cadmium: 0.1 mg/l chromium: (total) 3 mg/l lead: 1 mg/l	0.01 ppm 0.02 ppm 0.1 ppm (hexavalent) 0.1 ppm
Radiologicals	U-238: 1 X 10^{-3} uCi/ml U-natural: 1 X 10^{-3} uCi/ml	4 X 10^{-5} uCi/ml 3 X 10^{-5} uCi/ml

Chart 1

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Guidelines for acceptable limits of contaminants in municipal sewer systems, surface water, and runoff were established by the city of Philadelphia (see chart 2). When all guidelines were met, sewers and surface water drains were flushed.

[redacted]

[redacted]

[redacted]

Geology Information

The three-mile-radius study area surrounding the Frankford Arsenal site is located on the approximate boundary between the Atlantic Coastal Plain Physiographic Province to the southeast and the Piedmont Province to the northwest. The geologic framework of the Atlantic Coastal Plain consists of a southeastward-dipping wedge of unconsolidated sediments ranging in age from Cretaceous to Holocene. The Piedmont Province consists of southeastward-dipping deposits that have occasionally been eroded to reveal the underlying crystalline bedrock. Although altered by urbanization in many locations, the topography across the study area is maturely dissected, typically revealing a flat to undulating landscape. Streams within the study area are commonly moderately to highly meandering across broad flood plains. Wetlands larger than five acres in size are mapped along the Delaware River within the study area.[1,2]

The Quaternary age Trenton Gravel (corresponding to the Cape May Formation in New Jersey) lies subjacent to the soils beneath the site and consists of a gray to light red, well-bedded, very gravelly sand. Interbeds of sand and clay-silt layers are common. The maximum stratigraphic thickness of the Trenton Gravel is approximately 30 feet.[2,3,4]

Chart 1

Medium	Contaminant	Guideline or Disposal	Level
Soil	Metals Radiologicals Explosives	All contaminated soils removed All contaminated soil removed All contaminated soil flushed	
Water	Metals Radiologicals Explosives	See chart 2 See chart 2 See chart 2	
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Guidelines for acceptable limits of contaminants in municipal sewer systems, surface water, and runoff were established by the city of Philadelphia (see chart 2). When all guidelines were met, sewers and surface water drains were flushed.

Drinking Water Supply

People living within the three-mile-radius study area surrounding the Frankford Arsenal site obtain water supplies from three water supply authorities.

The Philadelphia Water Company (PWC) supplies water to all residents within the Pennsylv portion of the study area. This company utilizes three surface water intakes. The Baxter Treatr Plant, located on State Road at Linden Avenue, maintains a surface water intake on the Delav River. This intake, located approximately 3 miles upstream from the site, draws 220 million gal per day (mgd) for distribution. This segment of the Delaware River is influenced by tidal proce therefore, the presence of an upstream intake is relevant to the site. The remaining 2 intakes PWC are located on the Schuylkill River, approximately 10 miles southwest.

The Bensalem Township Municipal Water Authority (BTMWA) serves between 45,000 and 50,000 people in Bensalem Township. BTWMA purchases its water from PWC and distributes approximately 5.5 mgd.

The residents of New Jersey within the study area obtain their water from the New Jersey - American Water Company (NJAWC), which serves approximately 66,846 people in Palmyra, Cinnaminson, Riverton, Riverside, Delran, and Dalanco. NJAWC utilizes 17 groundwater wells (all completed in the Raritan Formation), 2 of which are located within the study area, approximately 3 miles southeast o the site.

Geology Information

The three-mile-radius study area surrounding the Frankford Arsenal site is located on the approximate boundary between the Atlantic Coastal Plain Physiographic Province to the southeast and the Piedmont Province to the northwest. The geologic framework of the Atlantic Coastal Plain consists of a southeastward-dipping wedge of unconsolidated sediments ranging in age from Cretaceous to Holocene. The Piedmont Province consists of southeastward-dipping deposits that have occasionally been eroded to reveal the underlying crystalline bedrock. Although altered by urbanization in many locations, the topography across the study area is maturely dissected, typically revealing a flat to undulating landscape. Streams within the study area are commonly moderately to highly meandering across broad flood plains. Wetlands larger than five acres in size are mapped along the Delaware River within the study area.[1,2]

The Quaternary age Trenton Gravel (corresponding to the Cape May Formation in New Jersey) lies subjacent to the soils beneath the site and consists of a gray to light red, well-bedded, very gravelly sand. Interbeds of sand and clay-silt layers are common. The maximum stratigraphic thickness of the Trenton Gravel is approximately 30 feet.[2,3,4]

WORK SHEET FOR RATING DISPOSAL SITES

ORIGINAL (Red)

FACTOR	OBSERVATION
WASTE CHARACTERISTICS	
Toxicity	3 for PCBs
Persistence	3
Radioactivity	none - per Rockwell report
Ignitability	none
Reactivity	none
Corrosiveness	none
Solubility	none
Volatility	none
Physical State	liquid
Infectiousness	none
Bioaccumulation Potential	PCB
Carcinogenicity, Teratogenicity and Mutagenicity	PCB
Other	--
WASTE MANAGEMENT PRACTICES	
Site Security	Space Age Protective Maintenance Contractor-guard at gate
Hazardous Waste Quantity	PCB waste materials - less than 1 drum
Total Waste Quantity	less than 1 drum
Waste Incompatibility	no
Use of Liners	no
Use of Leachate Collection Systems	no
Use of Gas Collection Systems	no
Use and Condition of Containers	PCB storage and PCB waste storage
Lack of Safety Measures	no
Evidence of Open Burning	no
Dangerous Heat Sources	no
Inadequate Waste Records	no
Inadequate Cover	no
Other	--

SECTION 7

ORIGINAL
(Red)

Frankford Arsenal
Philadelphia, Pennsylvania
TDD No. F3-8105-18
EPA No. PA-300

ATTACHMENTS

1. Letter from USATHMA dated 13 February 1981. Subject: Statement of Clearance for Frankford Arsenal.

2. Map of Frankford Arsenal.

3. Excerpts from Rockwell International Final Report for the Frankford Arsenal Decontamination/Cleanup Program, January 1981.

4. Feature Story on Frankford Arsenal Decontamination/Cleanup with USATHMA letter dated 20 March 1981.

DEPARTMENT OF THE ARMY

US ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY

ABERDEEN PROVING GROUND, MARYLAND 21010

ORIGINAL (Red)

REPLY TO ATTENTION OF

DRXTH-FS

13 FEB 1981

SUBJECT: Statement of Clearance for Frankford Arsenal, Philadelphia, PA

Commander
US Army Armament Materiel
Readiness Command
ATTN: DRSAR-IS
Rock Island, IL 61299

1. Reference:

a. Briefing to ASA (IL&FM), 3 Oct 77, subject: Frankford Arsenal Decontamination Program.

b. 2d Ind, 17 Nov 77 to letter DRCPM-DRR, 2 Nov 77, subject: Statement of Clearance for Area "A," Frankford Arsenal, Philadelphia, PA.

c. Letter, DRCPM-DRR, Office of the Project Manager for Chemical Demilitarization and Installation Restoration, 22 Dec 77, subject: Statement of Clearance for Area "B" at Frankford Arsenal, Philadelphia, Pennsylvania.

2. Reference 1.a divided Frankford Arsenal into four geographical areas, "A," "B," "C," and "D." References 1.b and 1.c certified Area "A" and portions of Area "B" as clear of all toxic and hazardous materials.

3. All buildings and lands within the areas designated "C" and "D" and those remaining portions of Area "B" not previously certified have been decontaminated under contract with Rockwell International. The requirements for unrestricted use have been met.

4. Inclosure 1 identifies areas decontaminated (crosshatched) in areas "C" and "D" plus those in Area "B" that were not previously certified. Inclosure 2 contains the Rockwell International final report which certifies that the decontamination effort has been completed. Inclosure 3 contains the Army certification of the rad decontaminated areas and Inclosure 4 contains the NRC certification of the rad decontaminated areas. A statement of clearance containing a description of the buildings and land certified free of toxic and hazardous materials is contained in Inclosure 5.

ORIGINAL
(Red)

DRXTH-FS 13 FEB 1981

SUBJECT: Statement of Clearance for Frankford Arsenal, Philadelphia, PA

5. A detailed compilation of backup data will be available from Rockwell in February 1981 and will become part of the official clearance package submitted to the General Services Administration.

5 Incl
as

JOHN D. SPENCE
Colonel, CmlC
Commanding

CF:
Cdr, ARRCOM, ATTN: DRSAR-SF, Rock Island, IL 61299, w/incl
Cdr's Rep, FACA, Phila, PA 19137 w/incl
Cdr, DARCOM, ATTN: DRCIS-A/ER, Alex, VA 22333, w/incl (10 cys)
Dir, Ofc of the Asst Secy of Defense, Ofc of Economic Adjustment, Boston, Massachusetts 02203, w/incl

ORIGINAL

active inactive & abandoned
inactive (CIRCLE ONE)

Name of Site: Frankford Arsenal
Location: Philadelphia, PA
Owner/Operator: Frankford Arsenal Caretaker Facility
Comments:

Prepared By: Michael A. Pelensky On May 22 19 81

FACTOR	OBSERVATION
RECEPTORS	
Population within 1000 feet	approx. 50 private homes
Distance to Nearest Drinking Water Well	none in vicinity
Distance to Nearest Off-Site Building	less than 1,000 ft.
Land Use/Zoning	federal
Critical Environment	no
Use of Site by Residents	no
Use of Nearest Buildings	on site buildings: administrative, security, elec. sub-stations
Presence of Public Water Supplies	Delaware River eastern portion of boundary
Presence of Aquifer Recharge Area	discharge
Presence of Transportation Routes	I95 adjacent to facility
Presence of Important Natural Resources	Delaware River & Frankford Creek border on east & south
Other	--
PATHWAYS	
Evidence of Contamination	none observed
Type of Contamination	--
Level of Contamination	--
Distance to Nearest Surface Water	Delaware River and Frankford Creek boundaries
Depth to Ground Water	varies with stream flow
Net Precipitation	11 inches
Soil Permeability	filled land, subsoil is clay
Bedrock Permeability	high, quaternary sand and gravel
Depth to Bedrock	>3 ft.
Erosion and Runoff Problems	affected by creek
Susceptibility to Flooding	in flood prone area
Slope Instability	stable
Seismic Activity	minor earthquake damage may be expected
Other	--